Baseline Assessments for Fish, Macroinvertebrates, and Herpetofauna in the Headwaters of Otter and Hanging Woman Creeks within the Tongue Powder CBNG Area

Prepared for:

Bureau of Land Management - Miles City Field Office and
the Interagency BLM Aquatic Task Group

Prepared by:

David Stagliano

Montana Natural Heritage Program
a cooperative program of the
Montana State Library and the University of Montana

June 2011

Baseline Assessments for Fish, Macroinvertebrates, and Herpetofauna in the Headwaters of Otter and Hanging Woman Creeks within the Tongue Powder CBNG Area

Prepared for:

Bureau of Land Management - Miles City Field Office and
the Interagency BLM Aquatic Task Group

Agreement Number:

L08AC13222

Prepared by:

David Stagliano

P.O. Box 201800 • 1515 East Sixth Avenue • Helena, MT 59620-1800 • 406-444-5354

This document should be cited as follows:

Stagliano, David. 2011. Baseline Assessments for Fish, Macroinvertebrates, and Herpetofauna in the Headwaters of Otter and Hanging Woman Creeks within the Tongue Powder CBNG Area. Report to the United States Bureau of Land Management and the Aquatic Task Force. Montana Natural Heritage Program, Helena, Montana. 17 pp. plus appendices.

Executive Summary

This report summarizes the first year of activities on the Aquatic Baseline Assessment for Fish, Macroinvertebrates, and Herpetofauna in the Headwaters of Otter and Hanging Woman Creeks. Project goals include: **1)** to **survey** and collect baseline information about the aquatic communities occurring in the Northwestern Great Plains Intermittent Stream ecological systems within unsurveyed portions of the headwaters of these two streams prior to CBNG development; and **2)** to **assess** aquatic community integrity by identifying and interpreting key community indicators found at the sites using standardized protocols and biotic thresholds, and to compare these against reference condition standards at the watershed level and local reach scale.

Habitat assessments, water quality measurements, herpotofauna, macroinvertebrate and/or fish surveys were performed at 20 predetermined lotic (stream channel) reaches (per conversation with J. Chaffin). These included sites on upper Otter and Hanging Woman Creeks, Trail and Bear Creeks and any tributaries containing suitable aquatic habitats. In total, we evaluated 87 stream reaches, of which 27 were dry reaches or ephemeral tributaries. Sixty stream reaches were seined or dip-netted for fish, of these, only 12 sites contained fish while 37 sites contained amphibians. Biological community integrity was calculated at 12 sites using Fish Integrated Biotic Indices (IBI's) and Observed/Expected Models (O/E), 20 sites were assessed with macroinvertebrate multi-metrics (MT MMI). The Northwestern Great Plains Intermittent Prairie Stream ecological system, which dominates this region, may not always contain fish, but is an important breeding and rearing areas for many species of amphibians and reptiles.

Habitat Evaluations. Of 87 sampling reaches evaluated within the study area, we found 32 in Proper Functioning Condition (PFC) with a stable trend; 49 were Functional at Risk (FAR) and 6 were ranked Nonfunctional (NF). Highest site integrity scores using both BLM Buglab stream (24 max. score) and PFC habitat assessment methods were recorded at the Hanging Woman Creek (HWC) sites ATG_143, a sedge meadow channel and ATG_137, a run-pool stream channel just upstream of the Montana border into Wyoming. Other fairly intact sites were near the lower 76 Creek and Trail Creek confluence, Hanging Woman Creek off Quietus Road (ATG_200, cover photo) and SF Taylor Creek. Sites with lower habitat scores were predominately degraded structurally by cattle usage and had associated high CPI values (upper Seventysix Creek and Trial Creek #183). The water quality parameters (conductivity & turbidity) recorded at both Corral and upper Otter Creek sites were above the threshold for impairment levels (DEQ 2006), and the Otter Creek site had visible signs of petroleum seepage from ground water.

Macroinvertebrate Communities. Overall, 110 unique macroinvertebrate taxa were reported from the 20 invertebrate assessment sites. No macroinvertebrate species of concern (SOC) were collected. Average macroinvertebrate taxa richness per site was 24.8 and the highest taxa richness reported at two Otter Creek sites was 36 taxa. Using the Montana DEQ macroinvertebrate multimetric index (MMI), 14 of the 20 sites were ranked non-impaired (good to excellent biological integrity), five were marginally unimpaired and one slightly impaired. Hanging Woman Creek sites #143 & #196 had reference condition macroinvertebrate scores for a Great Plains Prairie Stream with DEQ MMI scores of 69.4 and 76.6, respectively. Most stream sites that contained flowing connected water scored higher with the MMI than sites with exclusively interrupted pool areas. Overall, sites evaluated in the Hanging Woman Creek basin received higher macroinvertebrate MMI scores than those in the Otter Creek basin.

Fish Communities. Overall, seven fish species (four native/three introduced) were identified from 1,219 individuals collected from 12 lotic ATG sites containing fish (Table 2). All fish sites also reported amphibians present. Fathead minnows had the highest site occupancy rate 92% (11 of 12 sites) and abundance, proportionally contributing 71% of all individuals collected. Brassy minnows were the next most collected species at seven sites. Fish data collected in previous years from three sites

within the study area were evaluated for biological integrity changes over time. The most diverse site was the Otter Creek site at the old CCC cabin with five species (four native) and the most intact sites were Otter Creek at Taylor Creek and Fifteenmile Roads, each with four native species. Using Montana's Prairie Fish IBI, four of the 12 fish sites were ranked non-impaired (good biological integrity), eight were slightly impaired (moderate integrity) and two were moderately impaired (poor biotic integrity). No sites where fish were collected were ranked severely impaired by the Fish IBI, although some sites with no fish had habitat potential for fish to be present, but may have been limited by connectivity to colonization sources.

Amphibian and Reptile Incidentals. Thirteen herpetofauna species were collected in dipnets while seining and incidentally recorded in conjunction with the habitat and macroinvertebrate surveys. Woodhouse's Toad had the highest site occupancy, occurring at 37 of 60 sites, followed by the Tiger Salamander and Boreal Chorus Frog recorded at 27 and 26 sites, respectively. We reported six amphibian species. In order of site occupancy, they were: Woodhouse's Toad (*Bufo woodhousii);* Tiger Salamander (*Ambystoma tigrinum*); Boreal Chorus Frog (*Psuedacris maculate*); Northern Leopard Frog (*Rana pipiens*); Plains Spadefoot Toad (*Spea bombifrons*) - SOC; and Great Plains Toad (*Bufo cognatus*). We also found seven reptile species (again in order of site occurrence): Painted Turtle (*Chrysemys picta*); Terrestrial Garter Snake (*Thamnophis elegans*); Western Rattlesnake (*Crotalus viridis*); Plains Garter Snake(*Thamnophis radix*); Western Hognose Snake (*Heterodon nasicus*) - SOC; and Snapping Turtle (*Chelydra serpentina*) - SOC.

Acknowledgements

We would like to thank Jake Chaffin of the Bureau of Land Management - Miles City Field Office and the Interagency BLM Aquatic Task Group, headed by Bill Osthiemer of the BLM Wyoming for funding this project under agreement # L08AC13222. Report review and editing was provided by Bryce Maxell and Linda Vance. Fieldwork assistance was provided by Brent Cascadian, map production by Meghan Burns and report formatting by Coburn Currier (MTNHP).

All photos in the report were taken by MTNHP personnel, unless otherwise noted.

Table of Contents

List of Figures

List of Tables

Introduction

The Powder River basin in Wyoming and Montana is currently undergoing one of the world's largest coal bed natural gas (CBNG) developments. However, definitive information on the effects of CBNG product water on fish and aquatic invertebrates is lacking, making it difficult to predict the potential effects of this development on aquatic ecosystems (Davis et al. 2009). Therefore, pre-development baseline data and assessments of ecological condition are essential in assessing changes brought about by CBNG wells at the landscape or local reach scale. Despite numerous projects undertaken to document and monitor biological communities in the Powder and Tongue River watersheds (Confluence Consulting Inc. 2003, 2004; Stagliano 2006; Davis et al. 2009; Maxell 2009; Petersen et al. 2009; Senecal 2009), large gaps still exist in basic baseline surveys for riparian macroinvertebrate, fish, and herpetofauna. Many of the remaining gaps involve small prairie streams that constitute the Northwestern Great Plains Intermittent Prairie Stream ecological system (Stagliano 2005). This stream system may have downstream connectivity early in the season for potential fish spawning and nursery areas (Smith and Hubert 1989, Bramblett 2000, Trenka 2000) or no fish colonization at all, but by summer often becomes a string of isolated pools that are important breeding and rearing areas for amphibians. The largest unsurveyed landscapes containing this aquatic ecological system lie within the headwaters of Otter Creek (including Bear, Pasture and Bradshaw Creek) and upper Hanging Woman Creek (HWC) (including Trail and E.F. Trail Creek) (Figure 1). This area also contains proposed CBNG outfalls that could potentially be operational in the next year or two (MTDEQ, pers. comm.) (Figure 2). Identifying the presence of fish, macroinvertebrate, and herpetofauna that are Montana Species of Concern or BLM Sensitive Species prior to CBNG development is essential to understanding and potentially mitigating impacts to habitats and species.

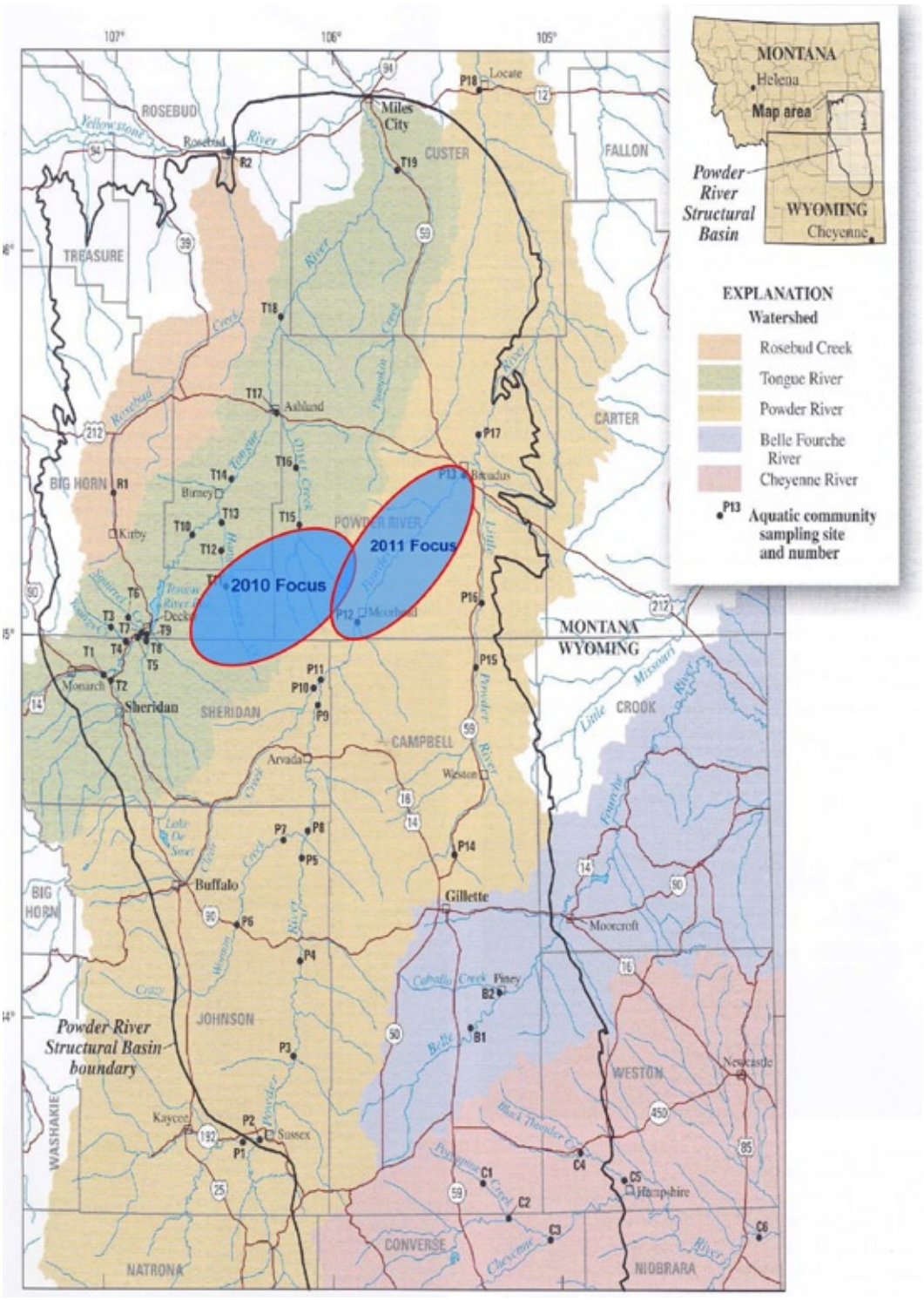

Figure 1. General overview of the project study area for the 2010 baseline assessments (USGS map).

Methods

Study Sites

Prairie stream channels in the targeted watershed areas were accessed at legal right-of-ways, on BLM or state-owned parcels or with permission from landowners (specifically the Padlock, OW, and Forks Ranches). Sites were chosen strategically rather than randomly because we were targeting the presence of surface water, although larger stream-order dry channels were walked significant distances (up to 2 km) to determine if isolated pools were present.

Riparian Assessments

Stream channels were walked in an upstream direction within the high water mark; GPS points were taken at any significant landform or channel change (e.g.,tributaries entering) until wetted pools were reached. The downstream pool was marked (GPS point) as the bottom of the reach and all ecological assessment protocols started from this point and continued upstream for 300m (designated the assessment area or "AA"). On-site habitat assessments were conducted using the rapid assessment protocol developed for the EPA by Barbour et al. (1999) with modifications for the BLM by the National Aquatic Assessment Team (scores 0-24) (http://www1.usu.edu/buglab/forms/Bug%20Protocol%20form.pdf). The process for determining Proper Functioning Condition followed Pritchard et al. (1993). Using the BLM assessment protocols, the reach was divided into 10 equally spaced transects. Parameters recorded at each were: wetted width, bankfull width, 3 channel depth measurements, % large woody debris and riparian shading. Basic water parameters (temperature, pH, conductivity) were recorded prior to biological sampling using a Horiba H-10 water monitor, calibrated for the higher conductivity range. The Livestock Use Index ("Cowpie" CPI) was assessed at all streams by walking a randomly chosen 75m reach on both sides of the stream channel in the riparian area within the assessment area and counting all the old and new cowpies (high CPI equals high cow usage). The goal of these evaluations is to characterize local reach geomorphology, riparian and in-stream habitat, and characteristics that influence aquatic community integrity. The sites ranking higher using these protocols are determined to have higher quality local-scale habitat. Habitat assessments were performed during the same visit as the biological sampling.

Macroinvertebrate Communities

Macroinvertebrates were collected from prairie stream pool sites with a modified EMAP Reach-Wide protocol (Lazorchak et al. 1998). Sampling involved multi-habitat, qualitative methods also outlined in the EPA protocols (Barbour et al. 1999). All habitats in the designated reach were apportioned along 10 transects and sampled qualitatively with a 500-micron D-frame net. A total of 10 habitat-weighted, randomized 1m jabs or kicks were conducted within the reach, allowing 10 seconds per kick, and composited into one sample. All organisms in the net were washed on a 500-micron sieve, transferred to a one- liter Nalgene bottle, labeled and preserved in 95% ethanol and brought to the MTNHP lab in Helena for processing (sorting, identification and data analysis) by David Stagliano at the MNHP Helena lab following protocols used by the BLM Buglab: http://www1.usu.edu/buglab/process/lab%20procedures.htm. These samples were collected within the MT DEQ recommend sampling time frame (June 1st-September 15th, (MTDEQ 2006). Macroinvertebrates were identified to the genus/species taxonomic level, counted and imported into EDAS (Jessup 2006), and biological metrics were calculated from the data using the Montana Department of Environmental Quality's newest multimetric macroinvertebrate (MMI) protocols (Jessup et al. 2005, Feldman 2006). Metric results were scored using the Montana DEQ bioassessment criteria and each sample categorized as nonimpaired or impaired according to threshold values (Table 1).

The macroinvertebrate MMI score is based upon a series of metrics that measure attributes of benthic macroinvertebrate communities that are sensitive to condition changes in a stream system (in the form of pollution or pollutants). The index score

represents the condition of the macroinvertebrate community at the time the sample was collected within that past year. If the index score is below the impairment threshold, the individual metrics can be used to provide insight as to why the communities are different from the reference condition (Barbour et. al 1999, Jessup et. al. 2005). The impairment threshold set by MT DEQ is **37** for the Eastern Plains Stream Index, thus any scores above this threshold are considered unimpaired.

Table 1. Impairment determinations from the macroinvertebrate MMI and O/E (RIVPACS) models (taken from Jessup 2005, Feldman 2006).

Ecoregion	RIVPACS	MMI	Impairment Determination
Mountain	≥0.8 or ≤1.2	≥63	Not impaired
	<0.8 or >1.2	<63	Impaired
Low Valley	≥0.8 or ≤1.2	≥48	Not impaired
	<0.8 or >1.2	<48	Impaired
Eastern Plains	≥0.8 or ≤1.2	≥37	Not impaired
	<0.8 or >1.2	<37	Impaired

Fish and Amphibian Surveys

Fish sampling in prairie stream pools was conducted with 20 foot straight seines in 25-30 meter increments within the 300m stream channel assessment length following protocols outlined in Bramblett et al. (2005). Fish captured while seining were transferred to holding buckets until the reach was completed, unless the reach was broken up by dry or impassable sections; in this case, fish were worked up and released within the section of capture. Fish holding in the buckets were identified to species, enumerated, examined for external anomalies (e.g. deformities, eroded fins, lesions, and tumors), and then released. Young-of-the-year fish less than 20 millimeters (TL) were noted on the field sheet (not included in the totals) and released. Voucher specimens were only be taken in the case of uncertain field identifications. Adult amphibians or reptiles seen while seining or walking the designated stream reach were counted and recorded even if they were not captured in the seine.

Analysis of the sampled fish communities used Integrated Biotic Indices (IBI) (Bramblett et. al 2005) and derived Observed/Expected (O/E) Fish Models (Stagliano 2005) to detect impairment in the biological integrity of the sites. The IBI involved calculation of a series of metrics evaluating different attributes of the community (Table 2). The metrics allowed calculation of an overall score between 0 and 100. Bramblett et al. (2005) did not propose threshold criteria for good, fair, and poor biological integrity for these scores. Therefore, we applied commonly used criteria. Scores of 75 to 100 indicate good to excellent biological integrity, 50-74 fair to good biological integrity, 25 to 49 indicated poor to fair biological integrity and scores <25% indicate poor biological integrity or severely impaired.

Table 2. Fish metrics and classification of fish species captured in the 2010 ATG Study.

Species	Scientific Name	Trophic*	Feeding Habitat†	Repro Guild‡	Tol**	Origin††	Total Length 3 years
Catostomidae							
White sucker	*Catostomus commersoni*	OM	BE	LO	TOL	N	229
Cyprinidae							
Fathead Minnow	*Pimephales promelas*	OM	GE	TOL§	TOL	N	76
Brassy minnow	*Hybognathus hankinsoni*	HB	BE		MOD	N	94
Lake Chub	*Couesius plumbeus*	OM	GE		MOD	N	95
Common Carp	*Cyprinus carpio*	OM	BE		TOL	I	381
Centrarchidae							
Green sunfish	*Lepomis cyanellus*	IC	GE	TOL§	TOL	I	102
Pumpkinseed	*Lepomis gibbosus*	IC	GE	TOL§	TOL	I	102

*HB = herbivore (> 90% plants or detritus); IC = invertivore/carnivore (>25% both invertebrates and vertebrates); IN = invertivore; OM = omnivore (25-90% plants or detritus) CA=carnivore (90% fish or other vertebrates);
† BE = benthic; GE = generalist; WC = water column: Brown (1971); Scott and Crossman (1973); Becker (1983)
‡ **Reproductive Guild** LO=Litho-obligate Guild; Scott and Crossman (1973); Pflieger (1997); Barbour et al. (1999) Tolerant reproductive strategists (§) are not litho-obligates, use parental care at spawning site: Scott and Crossman (1973); Pflieger (1997)
** INT = intolerant; MOD = moderately tolerant: TOL = tolerant; Barbour et al. (1999);
†† N = native; I = introduced; Holton and Johnson (2003)

Results

We evaluated 87 stream reaches in the study area: 27 were dry reaches or ephemeral tributaries, 44 were interrupted pool reaches and 16 contained connected flowing water throughout the reach (Figure 2). Sixty stream reaches were seined or dip-netted for fish; only 12 sites contained fish, while 37 sites contained amphibians (Figure 4, Table 3). The majority of sites visited represented the Northwestern Great Plains Intermittent Prairie Stream ecological system (AES D005, E005), except the lowest sites on Otter and Hanging Woman Creek which could be described as Great Plains Perennial Prairie Stream (AES C005) (Stagliano 2005). The Intermittent Prairie Stream ecological system was fishless 80% of the time in this study; and therefore, represents an important breeding and rearing area for macroinvertebrates, amphibians and reptiles. Habitat assessments, water quality measurements, herpotofauna, macroinvertebrate and/or fish surveys were performed at 20 predetermined lotic (stream channel) reaches (per conversation with J. Chaffin). We have identified and characterized reference condition indicator assemblages for these ecosystems previously, and used these to compare our observed species sampled. These included sites on upper Otter and Hanging Woman Creeks, Trail and Bear Creeks and any tributaries containing suitable aquatic habitats.

Habitat Evaluations

Of 87 sampling reaches evaluated within the study area, we found 32 in Proper Functioning Condition (PFC) with a stable trend; 49 were Functional at Risk (FAR) with an undetermined trend, and 6 were ranked Nonfunctional (NF) (Figure 3 & 4). In almost every case where a stream channel

Table 3. Vertebrates (species code) recorded during the ATG Riparian Surveys. Frequency of Occurrence (FO) was calculated from the # of wet sites (n=60).

Herpetofauna	# Sites Present	FO
Woodhouse's Toad (BUWO)	37	0.62
Tiger Salamander (AMTI)	27	0.45
Boreal Chorus Frog (PSMA)	26	0.43
Northern Leopard Frog (RAPI)	12	0.20
Painted Turtle (CHPI)	4	0.07
Terrestrial Gartersnake (THEL)	2	0.03
Western Rattlesnake (CRVI)	2	0.03
Eastern Racer (COCO)	2	0.03
Great Plains Toad (BUCO)	1	0.02
Plains Spadefoot Toad (SPBO)	1	0.02
Western Hognose Snake (HENA)	1	0.02
Plains Gartersnake (THRA)	1	0.02
Snapping Turtle (CHSE)	1	0.02
Fish		
Fathead Minnow (FAMI)	11	0.18
Brassy Minnow (BRMI)	7	0.12
White Sucker (WHSU)	4	0.07
Lake Chub (LACH)	3	0.05
Common Carp* (CARP)	1	0.02
Green Sunfish* (GRSU)	1	0.02
Pumpkinseed* (PUMP)	1	0.02

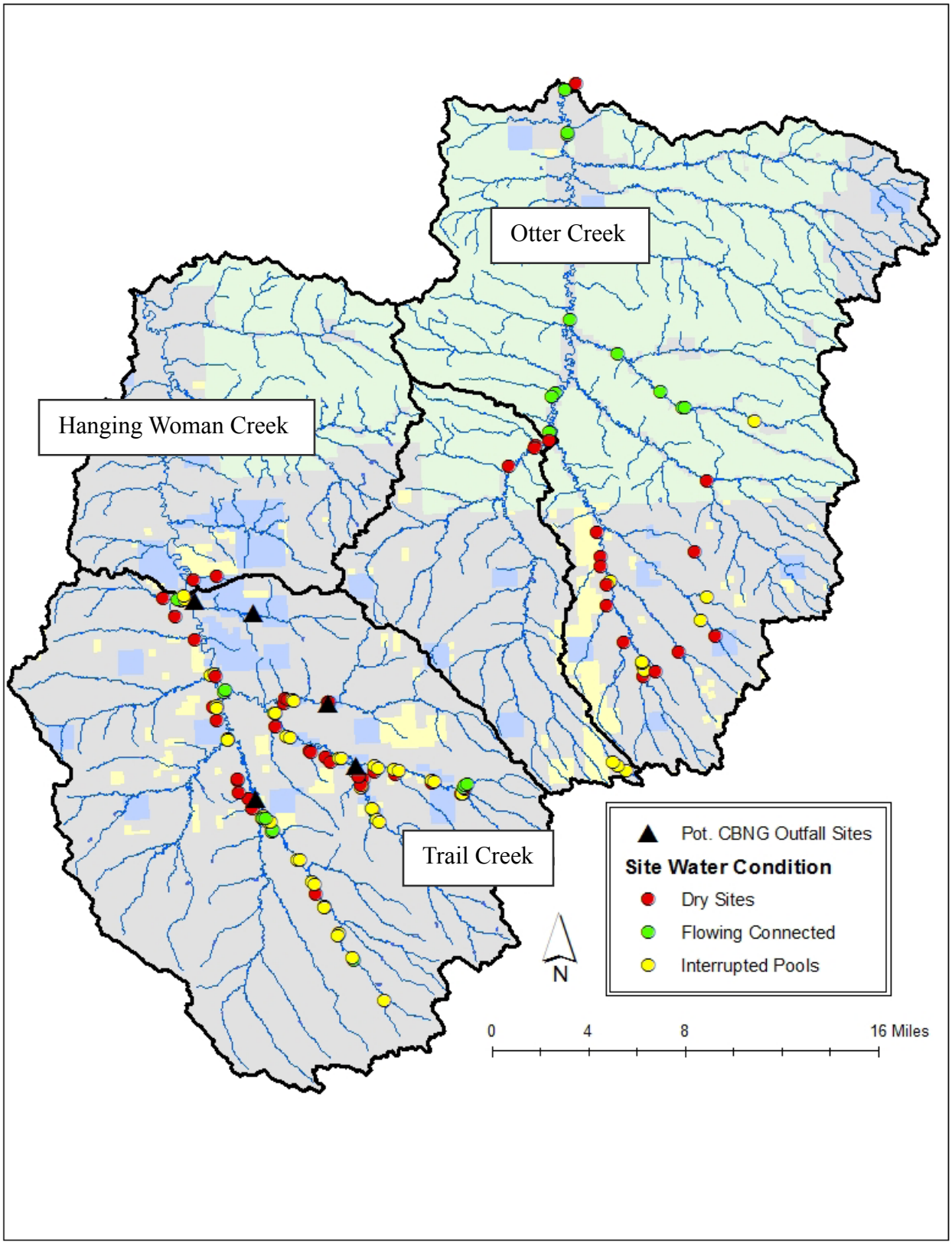

Figure 2. Stream Sites visited during the 2010 riparian assessments. (Red= dry channels, Yellow= Interrupted Pools, Green= Connected Flowing Water Reaches).

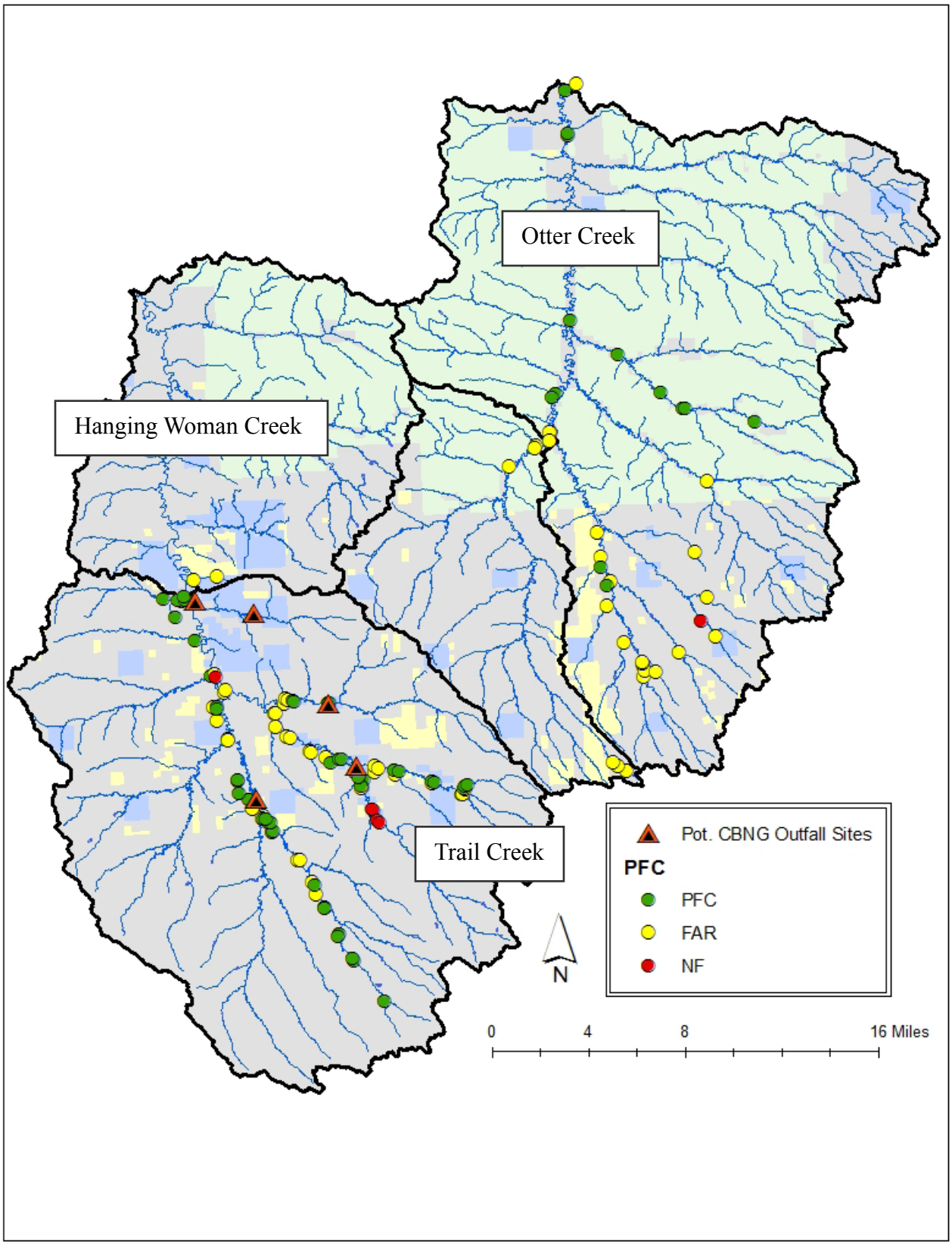

Figure 3. Riparian Functional Assessment Rankings for 2010 Reach Locations. PFC=Proper Functioning, FAR= Functional At Risk, NF=Non-functional.

riparian area was assessed as FAR or NF, the reason was hydrologic modification, generally by livestock. In a few cases, inadequate or poorly functioning culverts or stream crossings were the cause of the hydrological impairment. Livestock (predominately cattle) grazing on open range is the dominant agricultural use in the assessment area. Grazing in riparian areas can cause stream and river bank destabilization, loss of riparian shade, and increased sediment and nutrient loads in the aquatic ecosystem (George et al. 2002). The livestock use index (CPI) largely correlated with the functional assessment rank with NF and some FAR reaches reporting high CPI (Appendix A). During our field surveys, we saw several instances where cattle had free access to riparian and wetlands areas, and some cases where pugging and hummocking had severely impacted both the soil and the vegetation (Figure 4). Highest site integrity scores using both BLM Buglab stream (24 max. score) and PFC habitat assessment methods were recorded at the Hanging Woman Creek sites ATG_143, a sedge meadow channel and ATG_141, a run-pool stream channel just upstream of the Montana border into Wyoming on the OW Forks Ranch. Other fairly intact sites were near the lower 76 Creek and Trail Creek confluence and upper East Fork Trail Creek. Sites with lower habitat scores were predominately degraded structurally by cattle usage and had associated high CPI values.

Figure 4. Photo of a structurally cattle-impacted, non-functional stream reach, site ATG_158.

Other moderate integrity sites were near the 76 Creek and Trail Creek confluence, Otter Creek above Camp Creek and upper East Fork Trail Creek. The water quality parameters (conductivity & turbidity) taken at both Corral and upper Otter Creek sites were above the threshold for impairment levels (>3,000µs) (DEQ 2006), and the Otter Creek site had visible signs of petroleum seepage from ground water.

Macroinvertebrate Communities

Overall, 110 unique macroinvertebrate taxa were reported from the 20 invertebrate collection sites (Appendix B). No macroinvertebrate species of concern (SOC) were collected. Average macroinvertebrate taxa richness per invertebrate site was 24.8 and the highest taxa richness reported at 2 Otter Creek sites was 36 taxa. Using the Montana DEQ macroinvertebrate multimetric index (MMI), 14 of the 20 sites were ranked non-impaired (good to excellent biological integrity), 5 were marginally unimpaired and 1 slightly impaired (Table 4). Hanging Woman Creek sites #143 & #196 had reference condition macroinvertebrate scores for a Great Plains Prairie Stream with DEQ MMI scores of 69.4 and 76.6, respectively. Most stream sites that contained flowing connected water scored higher with the MMI than sites with exclusively pool areas. Overall, sites evaluated in the Hanging Woman Creek basin received higher macroinvertebrate MMI scores than those in the Otter Creek basin, despite Otter Creek mainstem sites averaging higher taxa richness per site. The MT MMI was not significantly correlated with the riparian or in stream assessment scores (Figure 5). As mentioned in previous studies (Stagliano 2006), the MT MMI was not as effective at ranking expected macroinvertebrate communities from intact prairie intermittent sites that contained fairly intact communities because they were dominated by more tolerant species of that assemblage.

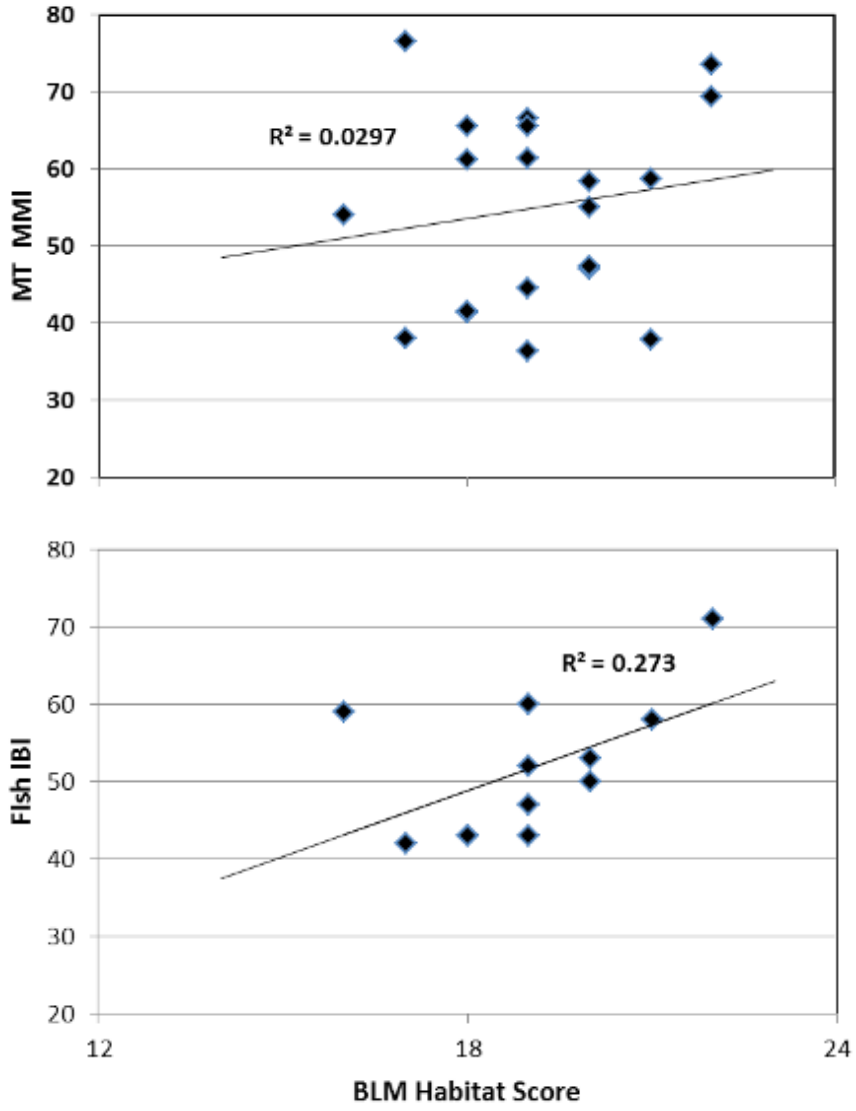

Figure 5. Macroinvertebrate MMI (top) and Fish IBI (bottom) Scores vs. BLM Stream Habitat Scores (max= 24) for 2010 ATG Sample Sites.

Table 4. BLM Site Habitat Scores, Functional Assessment Scores, Fish IBI and Macroinvertebrate MMI's. Metric Score Ranks (+): unimpaired, (-): impaired, (=): marginal impairment, (na) = not applicable, taxa group not collected.

Site Code	Site Name	BLM Hab Score	Riparian PFC	Fish IBI	MT MMI	Metric Score Ranks
ATG_124	Waddle Creek OW Ranch #1	16	FAR	64	54.0	= , + ,+
ATG_130	Hanging Woman Creek uppermost site WY	19	PFC	no fish	61.4	+ ,na, +
ATG_132	Hanging Woman Creek OW Ranch county road	20	PFC	no fish	47.1	+ ,na, +
ATG_134	Hanging Woman Creek WP #134	18	PFC	no fish	61.1	+ ,na, +
ATG_137	Hanging Woman Creek WP #137	21	PFC	no fish	58.7	+ ,na, +
ATG_141	Hanging Woman Creek Forks Ranch WY border	19	PFC	49	66.5	+, = , +
ATG_143	Hanging Woman Creek Forks Ranch WY	22	PFC	no fish	69.4	+ ,na, +
ATG_145	Hanging Woman Creek Forks Ranch WY	18	PFC	43	41.4	= , = ,=
ATG_150	Hanging Woman Creek Forks Ranch #150	18	PFC	43	65.6	= , = ,+
ATG_151	Hanging Woman Creek Forks Ranch #151	19	PFC	43	65.6	= , = ,+
ATG_160	Seventysix Creek trib to 'Trail Creek	20	PFC	no fish	47.4	+ ,na, +
ATG_163	Seventysix Creek Lower trib to 'Trail Creek	18	PFC	no fish	41.5	+ ,na, =
ATG_179	Trail Creek #179	17	FAR	no fish	38.0	= ,na, =
ATG_196	Hanging Woman Creek OW Ranch private bridg	17	FAR	42	76.6	= , =, +
ATG_200	Hanging Woman Creek at Quietus Road Bridge	20	PFC	53	55.0	+ ,+ , +
ATG_201	Otter Creek at Tenmile Creek Road	19	PFC	52	44.6	+ , + , =
ATG_202	Otter Creek at Taylor Creek Road	19	PFC	60	36.3	+ , + , -
ATG_203	Otter Creek at Camp Creek Road	20	PFC	50	58.4	+ , +, +
ATG_235	South Fork Taylor Creek	22	PFC	71	73.5	+ , +, +
ATG_CCC	Otter Creek at CCC Camp USFS	19	PFC	58	37.9	+ , + , -

Fish Communities

Overall, seven fish species (4 native/3 introduced, no SOCs) were identified from 1,219 individuals collected from 12 lotic ATG sites containing fish (Table 2, Table 3). All fish sites also reported amphibians present (Figure 6, Appendix A). Fathead minnows had the highest site occupancy rate of 92% (11 of 12 sites) and abundance, proportionally contributing 71% of all individuals collected (Table 3, Table 5). Brassy minnows were the next most collected species, occurring at 7 sites (Figure 7). The most diverse site was the Otter Creek site at the old CCC cabin with 5 species (4 native) and the most intact sites were Otter Creek at Taylor Creek and Fifteenmile Creek Roads each with 4 native species. Using Montana's Prairie Fish IBI, 4 of the 12 fish sites were ranked non-impaired (good biological integrity), 8 were slightly impaired (moderate integrity) and 2 were moderately impaired (poor-fair biotic integrity). No sites where fish were collected were ranked severely impaired by the Fish IBI, although some sites with no fish had habitat potential for fish to be present (permanent pools), but may have been limited by hydrologic connectivity to colonization sources either naturally (dry reaches) or man-induced (dams, stock ponds). The fish IBI community measure was more positively correlated to the BLM Habitat Score than the macroinvertebrate MMI (Figure 5).

Within the Great Plains Intermittent Prairie Streams, the species expected to occur most often at reference condition sites are the fathead minnow and brook stickleback (Table 5), but the upper Tongue and Powder River Basins are slightly out of the range of this species (brook stickleback); therefore, we did not collect them or expect them

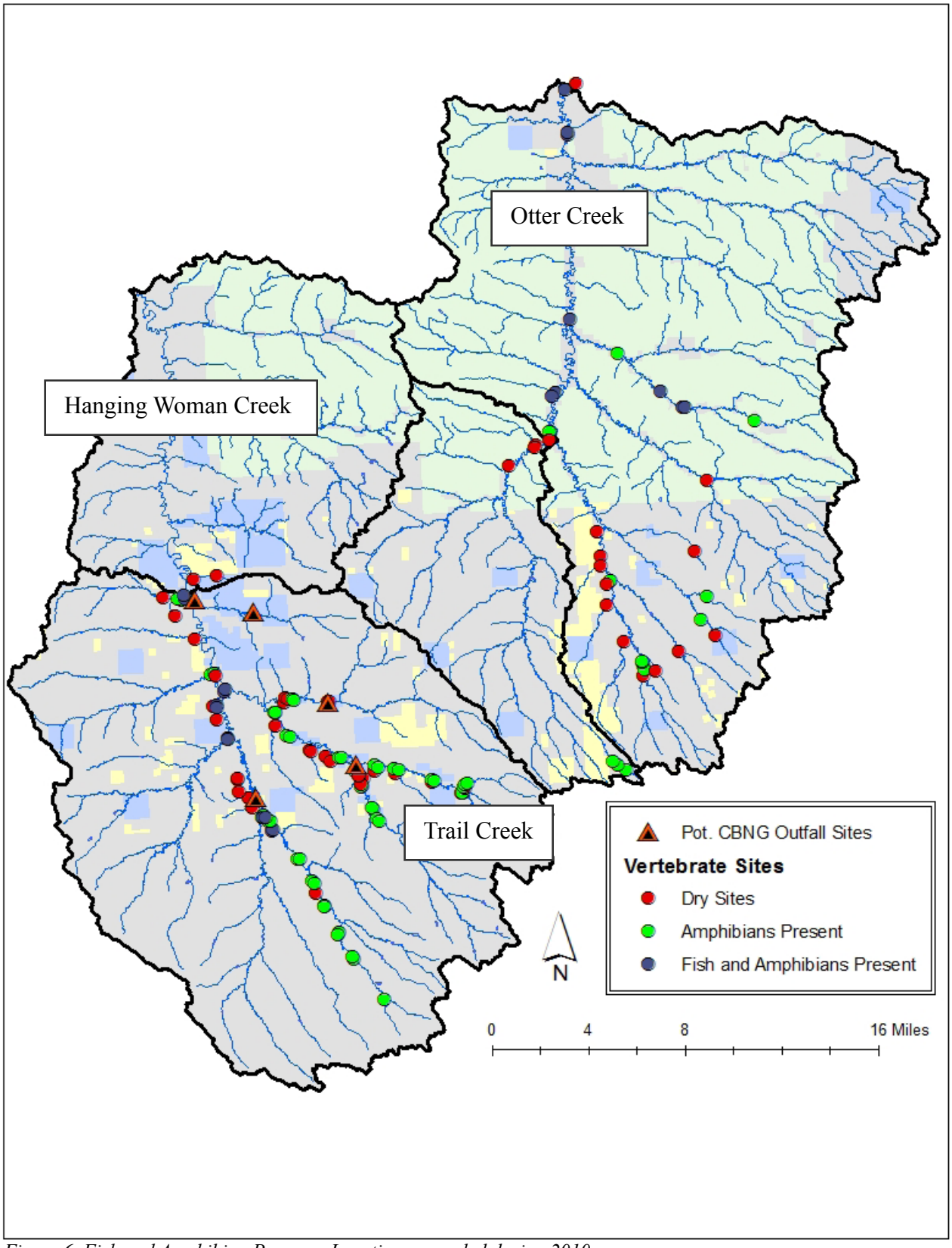

Figure 6. Fish and Amphibian Presence Locations recorded during 2010 surveys.

Table 5. Fish abundance, IBI"s and O/E results for the 12 sites reporting fish.

	ATG_124	ATG_141	ATG_145	ATG_150	ATG_151	ATG_196	ATG_200	ATG_201	ATG_202	ATG_203	ATG_235	ATG_CCC
Brassy Minnow	15	10	0	0	0	0	15	72	40	22	0	61
Common Carp*	0	0	0	0	0	2	0	0	0	0	0	0
Lake Chub	0	0	0	0	0	0	0	0	55	0	25	10
Fathead Minnow	2	16	50	40	20	482	55	35	5	110	0	15
Green Sunfish*	0	16	0	0	0	2	0	0	0	0	0	0
Pumpkinseed*	0	0	0	0	0	0	0	0	0	0	0	4
White Sucker	0	0	0	0	0	0	5	0	25	5	0	5
Total # species	2	3	1	1	1	3	3	2	4	3	1	5
Native Species	2	2	1	1	1	1	3	2	4	3	1	4
Total Individuals	17	42	50	40	20	486	75	107	125	137	25	95
IBI	**64**	49	43	43	43	42	53	52	**60**	50	**71**	**58**
O/E	0.82	0.82	0.41	0.41	0.41	0.41	1.22	0.82	1.63	1.22	1.25	0.57
	81.6	81.6	40.8	40.8	40.8	40.8	122.4	81.6	163.3	122.4	125.0	57.1

Figure 7. Photo of brassy minnows in spawning colors and white sucker (ATG_ CCC)

to occur in these sites and revised the Observed / Expected (O/E) Fish Model predictors accordingly. Using Montana's Prairie Fish IBI of the 12 fish sites were ranked non-impaired (good to excellent biological integrity), 6 were slightly impaired (moderate integrity) and 5 moderately impaired (poor biotic integrity) (Table 4). No sites were ranked severely impaired by the Fish IBI. The O/E scores agreed with the IBI scores in most cases, except for the larger stream reaches that could be almost classified as Perennial Prairie Streams (ATG_CCC) (Table 4).; thus, the O/E would expect more fish species to be present than are actually observed causing an artificially low score. Otter Creek CCC site was ranked unimpaired/slightly-impaired by the IBI, but the O/E ranked this site as moderately impaired (O/E=57.6), because it would be missing almost 43% of the expected taxa.

Amphibian and Reptile Communities

A total of 13 herpetofauna species were recorded across the study region and at least one amphibian species was present at 62% of wetted sites, while no occurrences were recorded surveying dry reaches (Table 3). Upper Trail Creek near Spring Creek (ATG_176) had the highest site herpetofauna species richness with five species, while 25 sites reported three commonly associated species (Woodhouse's Toad, Bufo woodhousii, Tiger Salamander, Ambystoma tigrinum (Figure 8) and Boreal Chorus Frog, Psuedacris maculata). Woodhouse's Toad had the highest site occupancy, occurring at 37 of 60 sites, followed by the Tiger Salamander and Boreal Chorus Frog recorded at 27 and 26 sites, respectively (Table 3). The Northern Leopard Frog, Rana pipiens occurred at 12 sites and was more commonly associated with sites that also contained fish (8 co-occurring sites). Plains Spadefoot Toad, Spea bombifrons (SOC), and the Great Plains Toad, Bufo cognatus) were recorded at one site each in the Trail Creek and Upper Hanging Woman Creek drainages. Seven reptile specieswere recorded during the surveys (in order of site occurrence: Painted Turtle, Chrysemys picta, Terrestrial Garter Snake, Thamnophis elegans Western Rattlesnake, Crotalus viridis; Plains Garter Snake, Thamnophis radix; Western Hognose Snake, Heterodon nasicus (SOC) and Snapping Turtle, Chelydra serpentina (SOC (Table 3).

Figure 8. Seine haul of Tiger Salamander Larvae (60-70 mm SLV) at site ATG_198.

Conclusions and Recommendations

Diverse aquatic communities were identified at the majority of intermittent aquatic sites in the upper HWC and Otter Creek region, despite most sites lacking fish communities. Stream sites visited in the HWC basin had higher than average landscape integrity reflected at the local reach-scale with high biological and riparian integrity. HWC consistently scored higher with the macroinvertebrate community metrics, while Otter Creek scored better with the fish community metrics. Threats to this ecological system that can be managed include grazing and livestock use around the riparian areas. This occurs moderately in these basins and can have strong local effects resulting in sedimentation, stream widening at cattle crossings and loss of functional channel hydrology. Introductions of game (green sunfish, bullheads or pumpkinseeds) or forage fish in stock ponds anywhere in the watershed can pose potential problems for native fish as these introduced fish become permanent residents and either outcompete or prey upon the native fish communities. These prairie river ecological types are abundant in terms of river miles across the Northern Great Plains of western North America, but the hydrology (i.e. water permanence) can be easily affected by upstream dams or diversions in the watershed. Stock ponds that are stocked with game fish, and bait bucket introductions can also contribute to the community degradation brought about by the introduced fish species. Diverse communities with high biological integrity are highly correlated with good riparian condition and high habitat quality. Thus, effective riparian zone management in the grazing of cattle will contribute to intact vegetation buffers and less sediment in the aquatic environment. Macroinvertebrate communities ranked few sites as impaired, even those with an impaired riparian condition, but the effectiveness of macroinvertebrates in assessing prairie streams is still under debate in Montana.

Community results from the habitat, fish and macroinvertebrate surveys combined to rank the following sites from highest biological integrity to lowest within their aquatic ecological classification codes:

Northwestern Great Plains Perennial Prairie Stream (AES code C005)
1) Hanging Woman Creek (Quietus Road, OW Ranch)
2) Otter Creek CCC camp site

Northwestern Great Plains Intermittent Prairie Stream (AES code D005)
1) Otter Creek at Camp Creek Road
2) South Fork Taylor Creek
3) Hanging Woman Creek #141
4) Waddle Creek OW Ranch #1
5) HWC #150, HWC #151
6) HWC #202
7) HWC #201

Great Plains Intermittent Fishless Prairie Stream (AES code E005)
1) Hanging Woman Creek #143
2) Hanging Woman Creek #130
3) HWC #137
4) HWC #134
5) Seventysix Creek #160
6) HWC #132
7) Seventysix Creek #163
8) Trail Creek #179

Northwestern Great Plains Perennial Spring (AES code S005)
1) Upper Trail Creek Spring

Literature Cited

Allan, J. D., D. L. Erickson and J. Fay. 1997. The influence of catchment land use on stream Integrity across multiple spatial scales. Freshwater Biology 37:149-162.

Barbour, M., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. United States Environmental Protection Agency; Office of Water: Washington, D.C.

Bramblett, R. G., T. R. Johnson, A. V. Zale, A. V., and D. Heggem. 2005. Development and Evaluation of a Fish Assemblage Index of Biotic Integrity for Northwestern Great Plains. Transactions of the American Fisheries Society 134:624–640, 2005.

Bramblett, R. G., and K. D. Fausch. 1991. Variable fish communities and the index of biotic integrity in a western Great Plains river. Transactions of the American Fisheries Society 120:752–769.

Dodds, W. K., K. Gido, M. R. Whiles, K. M. Fritz, and W. J. Matthews. 2004. Life on the edge: The ecology of Great Plains prairie streams. BioScience 54: 205–216.

Feldman, D. 2006. Interpretation of New Macroinvertebrate Models by WQPB. Draft Report. Montana Department of Environmental Quality, Planning Prevention and Assistance Division, Water Quality Planning Bureau, Water Quality Standards Section.1520 E. 6th Avenue, Helena, MT 59620. 14 pp.

George, M.R., R.E. Larsen, N.K. McDougald, K.W. Tate, J.D. Gerlach, Jr., and K.O. Fulgham. 2002. Influence of grazing on channel morphology of intermittent streams. J. Range Management. 55:551-557.

Hawkins, C. P. and R. H. Norris. 2000. Performance of different landscape classifications for aquatic bioassessments: introduction to the series. Journal of the North American Benthological Society.19:3 (367-369).

Holton, G. D., and H. E. Johnson. 2003. A field guide to Montana fishes, 3rd edition. Montana Fish, Wildlife, and Parks, Helena.

Jessup, B., J. Stribling; and C. Hawkins. 2005. Biological Indicators of Stream Condition in Montana Using Macroinvertebrates. Tetra Tech, Inc. November 2005 (draft).

Jessup, B. 2006. Ecological Data Application System (EDAS) Version MT 3.3.2k A User's Guide. Tetra Tech, Inc.

Lazorchak, J.M., Klemm, D.J., and D.V. Peck (editors). 1998. Environmental Monitoring and Assessment Program - Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams. EPA/620/R-94/004F. U.S. Environmental Protection Agency, Washington, D.C.

Montana Department of Environmental Quality (DEQ). 2006. Sample Collection, Sorting, and Taxonomic Identification of Benthic Macroinvertebrates. Water Quality Planning Bureau. Standard Operation Procedure (WQPBWQM-009).

Peterson, D.A., Clark, M.L., Foster, Katharine, Wright, P.R., and Boughton, G.K., 2010, Assessment of ecological conditions and potential effects of water produced from coalbed natural gas development on biological communities in streams of the Powder River structural basin, Wyoming and Montana, 2005–08: USGS Scientific Investigations Report 2010–5124, 84 p. http://pubs.usgs.gov/sir/2010/5124/pdf/SIR10-5124.pdf

Pritchard, D., F. Barret, H. Berg, W. Hagenbuck, R. Krapf, R. Leinard, S. Leonard, M. Manning, C. Noble, Tippy, D. 1993. Riparian Area Management: A User Guide To Assessing Proper Functioning Condition. Technical Reference 1737-9. USDI Bureau of Land Management Service Center. Denver, Colorado. USA. 109 pp.

Relyea, C., G. Minshall, Robert Danehy. 2000. Stream Insects as Bioindicators of Fine Sediment, Stream Ecology Center, Department of Biological Sciences, Idaho State University. Watershed Management 2000 Conference.

Stagliano, David, M. 2005. Aquatic Community Classification and Ecosystem Diversity in Montana's Missouri River Watershed. Report to the Bureau of Land Management. Montana Natural Heritage Program, Helena, Montana. 65 pp. plus appendices. http://www.mtnhp.org/reports.asp#Ecology

Appendix A. All Sites Visited and Site Information Collected During the 2010 ATG Riparian Assessments

Site_code	Stream	Latitude	Longitude	Dry	Inter pools	Flow Water	Fish Pres	Amph Pres	Fish + Amphib	BLM Hab	PFC	CPI
ATG_124	Waddle Creek	45.049	-106.452	0	1	0	1	1	1	16	FAR	6
ATG_124end	Waddle Creek	45.049	-106.452	0	1	0	1	1	1	16	FAR	6
ATG_125	Dry Trib to HWC	45.024	-106.446	1	0	0	0	0	0	18	PFC	2
ATG_126	Dry Trib to HWC	45.013	-106.437	1	0	0	0	0	0	18	PFC	0
ATG_126b	Dry Trib to HWC	45.109	-106.477	1	0	0	0	0	0	19	PFC	0
ATG_126c	Dry Trib to HWC	45.017	-106.445	1	0	0	0	0	0	19	PFC	0
ATG_127	Dry Trib to HWC	45.025	-106.446	1	0	0	0	0	0	19	PFC	1
ATG_128	HWC below West Prong Hanging Woman Creek	45.002	-106.425	0	1	0	0	1	0	16	FAR	4
ATG_128end	HWC below West Prong Hanging Woman Creek	45.001	-106.426	0	1	0	0	1	0	16	FAR	4
ATG_129	Hanging Woman Creek	44.889	-106.329	0	1	0	0	1	0	18	PFC	0
ATG_130	Hanging Woman Creek	44.914	-106.354	0	0	1	0	1	0	19	PFC	4
ATG_130end	Hanging Woman Creek	44.915	-106.355	0	1	0	0	1	0	19	PFC	4
ATG_132	Hanging Woman Creek	44.930	-106.365	0	1	0	0	1	0	20	PFC	4
ATG_132end	Hanging Woman Creek	44.929	-106.366	0	1	0	0	1	0	20	PFC	4
ATG_134	Hanging Woman Creek	44.947	-106.377	0	1	0	0	1	0	18	PFC	2
ATG_134end	Hanging Woman Creek	44.946	-106.376	0	1	0	0	1	0	18	PFC	2
ATG_136	Dry Trib to HWC	44.954	-106.384	1	0	0	0	0	0	16	FAR	2
ATG_137	Hanging Woman Creek	44.962	-106.386	0	1	0	0	1	0	21	FAR	3
ATG_138	end point	44.960	-106.384	0	1	0	0	1	0	21	PFC	3
ATG_139	Hanging Woman Creek	44.975	-106.397	0	1	0	0	1	0	20	FAR	7
ATG_140	end point	44.975	-106.395	0	1	0	0	1	0	20	FAR	7
ATG_141	Hanging Woman Creek	44.993	-106.419	0	0	1	1	1	1	19	PFC	11
ATG_142	end point	44.993	-106.417	0	0	1	1	1	1	19	PFC	11
ATG_143	Hanging Woman Creek	44.999	-106.421	0	1	0	0	1	0	22	PFC	8
ATG_144	end point	44.999	-106.419	0	1	0	0	1	0	22	PFC	8
ATG_145	Hanging Woman Creek	45.001	-106.425	0	0	1	1	1	1	18	PFC	2
ATG_146	end point	45.001	-106.423	0	0	1	1	1	1	19	PFC	2

Site_code	Stream	Latitude	Longitude	Dry	Inter pools	Flow Water	Fish Pres	Amph Pres	Fish + Amphib	BLM Hab	PFC	CPI
ATG_147	Dry Trib to HWC	45.007	-106.434	1	0	0	0	0	0	17	FAR	0
ATG_148	Dry Trib to HWC	45.061	-106.462	1	0	0	0	0	0	17	FAR	0
ATG_149	Dry Trib to HWC	45.069	-106.464	1	0	0	0	0	0	17	FAR	0
ATG_150	Hanging Woman Creek	45.069	-106.461	0	1	0	1	1	1	18	PFC	0
ATG_151	end point	45.068	-106.461	0	1	0	1	1	1	18	PFC	0
ATG_152	Deep Creek	45.056	-106.412	1	0	0	0	0	0	17	FAR	0
ATG_153	Dry Trib to HWC	45.040	-106.384	1	0	0	0	0	0	17	FAR	2
ATG_154	Mull Draw dry	45.039	-106.383	1	0	0	0	0	0	17	FAR	6
ATG_155	Dry Trib to Trail Creek	45.036	-106.370	1	0	0	0	0	0	17	FAR	0
ATG_156	Dry Trib to Trail Creek	45.033	-106.367	1	0	0	0	0	0	18	PFC	0
ATG_157	Dry Trib to Trail Creek	45.022	-106.339	1	0	0	0	0	0	18	PFC	0
ATG_158	Seventysix Creek	45.003	-106.332	0	1	0	0	1	0	13	NF	24
ATG_158end	Seventysix Creek	45.004	-106.332	0	1	0	0	1	0	13	NF	24
ATG_159	Seventysix Creek	44.998	-106.330	0	1	0	0	1	0	12	NF	36
ATG_159	Seventysix Creek	44.996	-106.327	0	1	0	0	1	0	12	NF	36
ATG_160	Seventysix Creek	45.018	-106.340	0	1	0	0	1	0	20	PFC	5
ATG_161	Seventysix Creek	45.017	-106.342	0	1	0	0	1	0	20	FAR	12
ATG_162	Seventysix Creek	45.019	-106.341	1	0	0	0	0	0	20	PFC	0
ATG_163	Seventysix Creek	45.027	-106.345	0	1	0	0	1	0	18	PFC	0
ATG_164	end point	45.026	-106.346	0	1	0	0	1	0	19	PFC	0
ATG_165	Dry Trib to Trail Creek	45.026	-106.330	1	0	0	0	0	0	17	FAR	2
ATG_166	Iron Springs Creek	45.025	-106.313	1	0	0	0	0	0	17	FAR	3
ATG_167	Trail Creek	45.027	-106.313	0	1	0	0	1	0	18	PFC	4
ATG_168	end point	45.026	-106.309	0	1	0	0	1	0	17	PFC	2
ATG_169	Dry Trib to Trail Creek	45.018	-106.282	1	0	0	0	0	0	17	FAR	3
ATG_170	Trail Creek	45.020	-106.282	0	1	0	0	1	0	21	PFC	2
ATG_171	end point	45.019	-106.279	0	1	0	0	1	0	21	PFC	0
ATG_172	Dry Trib to Trail Creek	45.011	-106.257	1	0	0	0	0	0	22	PFC	0

Site_code	Stream	Latitude	Longitude	Dry	Inter pools	Flow Water	Fish Pres	Amph Pres	Fish + Amphib	BLM Hab	PFC	CPI
ATG_173	Trail Creek	45.011	-106.256	0	1	0	0	1	0	17	FAR	6
ATG_173end	Trail Creek	45.011	-106.255	0	1	0	0	1	0	17	FAR	11
ATG_175	Intermittent Wetland	45.014	-106.254	1	0	0	0	0	0	17	FAR	0
ATG_176	Trail Spring Creek confluence	45.014	-106.255	0	0	1	0	1	0	22	PFC	5
ATG_177	Spring Creek end point	45.015	-106.253	0	0	1	0	1	0	20	PFC	0
ATG_178	Trail Spring Creek confluence end point	45.016	-106.251	0	0	1	0	1	0	20	PFC	0
ATG_179	Trail Creek	45.030	-106.330	0	1	0	0	1	0	17	FAR	0
ATG_180	Trail Creek	45.029	-106.326	0	1	0	0	1	0	17	FAR	0
ATG_181	Trail Creek below 76 cr	45.035	-106.360	0	1	0	0	1	0	22	PFC	0
ATG_182	Trail Creek below 76 cr	45.035	-106.357	0	1	0	0	1	0	22	PFC	0
ATG_183	Trail Creek	45.049	-106.402	0	1	0	0	1	0	16	FAR	27
ATG_184	Trail Creek	45.049	-106.400	0	1	0	0	1	0	16	FAR	23
ATG_185	East Fork Trail Creek trib	45.069	-106.404	1	0	0	0	0	0	17	FAR	12
ATG_186	East Fork Trail Creek	45.072	-106.402	1	0	0	0	0	0	17	FAR	11
ATG_187	East Fork Trail Creek	45.072	-106.400	1	0	0	0	0	0	17	FAR	9
ATG_188	East Fork Trail Creek	45.072	-106.397	0	1	0	0	1	0	19	PFC	4
ATG_189	East Fork Trail Creek	45.071	-106.395	0	1	0	0	1	0	19	PFC	8
ATG_190	East Fork Trail Creek	45.069	-106.366	1	0	0	0	0	0	20	PFC	2
ATG_191	East Fork Trail Creek	45.069	-106.365	1	0	0	0	0	0	20	PFC	4
ATG_192	Trail Creek	45.064	-106.412	0	1	0	0	1	0	16	FAR	19
ATG_193	end point	45.063	-106.411	0	1	0	0	1	0	16	FAR	19
ATG_194	P K Creek	45.133	-106.487	0	1	0	0	1	0	19	PFC	0
ATG_195	end point	45.134	-106.490	0	0	1	0	1	0	19	PFC	0
ATG_195b	P K Creek dry	45.124	-106.493	1	0	0	0	0	0	19	PFC	0
ATG_195bend	P K Creek dry	45.135	-106.503	1	0	0	0	0	0	19	PFC	0
ATG_196	Hanging Woman Creek	45.077	-106.455	0	0	1	1	1	1	17	FAR	7

Site_code	Stream	Latitude	Longitude	Dry	Inter pools	Flow Water	Fish Pres	Amph Pres	Fish + Amphib	BLM Hab	PFC	CPI
ATG_197	end point	45.079	-106.453	0	0	1	1	1	1	17	FAR	7
ATG_198	Corral Creek	45.088	-106.465	0	1	0	0	1	0	19	PFC	8
ATG_199	Corral Creek	45.088	-106.461	0	1	0	0	1	0	16	FAR	15
ATG_199end	Corral Creek	45.087	-106.461	1	0	0	0	0	0	12	NF	8
ATG_199b	Circle Bar Draw	45.147	-106.457	1	0	0	0	0	0	18	PFC	0
ATG_199bend	Circle Bar Draw	45.145	-106.477	1	0	0	0	0	0	18	PFC	0
ATG_200	Hanging Woman Creek	45.134	-106.484	0	1	0	1	1	1	20	PFC	0
ATG_200end	Hanging Woman Creek	45.136	-106.485	0	1	0	1	1	1	20	PFC	0
ATG_201	Otter Creek	45.430	-106.144	0	0	1	1	1	1	19	PFC	0
ATG_202	Otter Creek	45.292	-106.148	0	0	1	1	1	1	19	PFC	0
ATG_10m	Ten Mile Creek	45.434	-106.134	1	0	0	0	0	0	15	FAR	12
ATG_203	Otter Creek	45.249	-106.163	0	0	1	1	1	1	20	PFC	8
ATG_203end	Otter Creek	45.247	-106.166	0	0	1	1	1	1	20	PFC	8
ATG_205	Otter Creek	45.225	-106.168	0	0	1	0	1	0	16	FAR	0
ATG_205end	Otter Creek	45.226	-106.169	0	0	1	0	1	0	16	FAR	0
ATG_207	Otter Creek	45.220	-106.170	1	0	0	0	0	0	17	FAR	18
ATG_208	Otter Creek	45.218	-106.181	1	0	0	0	0	0	17	FAR	15
ATG_209	Otter Creek	45.216	-106.183	1	0	0	0	0	0	17	FAR	22
ATG_210	Bear Creek	45.206	-106.205	1	0	0	0	0	0	16	FAR	0
ATG_211	Otter Creek	45.164	-106.132	1	0	0	0	0	0	17	FAR	0
ATG_212	Otter Creek trib	45.149	-106.131	1	0	0	0	0	0	17	FAR	0
ATG_213	Otter Creek trib	45.144	-106.130	1	0	0	0	0	0	18	PFC	0
ATG_214	Otter Creek trib	45.134	-106.124	0	1	0	0	1	0	18	PFC	0
ATG_215	Otter Creek	45.134	-106.123	0	1	0	0	1	0	16	FAR	0
ATG_216	Otter Creek trib	45.132	-106.127	1	0	0	0	0	0	18	PFC	0
ATG_217	Billup Reservior	45.120	-106.127	1	0	0	0	0	0	14	FAR	0
ATG_218	Boxelder Creek	45.097	-106.114	1	0	0	0	0	0	14	FAR	0
ATG_219	Otter Creek	45.077	-106.098	1	0	0	0	0	0	14	FAR	0

Site_code	Stream	Latitude	Longitude	Dry	Inter pools	Flow Water	Fish Pres	Amph Pres	Fish + Amphib	BLM Hab	PFC	CPI
ATG_220	Otter Creek	45.083	-106.099	0	1	0	0	1	0	15	FAR	0
ATG_221	Otter Creek	45.080	-106.098	0	1	0	0	1	0	16	FAR	8
ATG_222	Otter Creek Reservoir	45.084	-106.099	0	1	0	0	1	0	18	PFC	2
ATG_223	Otter Creek Reservoir	45.085	-106.099	0	1	0	0	1	0	17	FAR	4
ATG_224	Bear Creek Res. #2	45.020	-106.117	0	1	0	0	1	0	17	FAR	5
ATG_225	Bear Creek Res. #2	45.024	-106.124	0	1	0	0	1	0	14	FAR	2
ATG_226	Bear Creek Res. #2 end	45.026	-106.127	0	1	0	0	1	0	14	FAR	2
ATG_227	Cedar Creek	45.079	-106.089	1	0	0	0	0	0	14	FAR	0
ATG_228	Pasture Creek	45.090	-106.068	1	0	0	0	0	0	14	FAR	4
ATG_229	Bradshaw Creek	45.109	-106.048	0	1	0	0	1	0	12	NF	23
ATG_230	Bradshaw Creek	45.099	-106.036	1	0	0	0	0	0	13	FAR	22
ATG_231	Dever's Prong	45.122	-106.042	0	1	0	0	1	0	15	FAR	13
ATG_232	Little Bradshaw Creek	45.150	-106.050	1	0	0	0	0	0	13	FAR	25
ATG_233	Indian Creek below Thompson Res	45.192	-106.037	1	0	0	0	0	0	14	FAR	6
ATG_234	South Fork Taylor Creek	45.227	-105.995	0	1	0	0	1	0	20	PFC	5
ATG_235	South Fork Taylor Creek	45.237	-106.056	0	0	1	1	1	1	22	PFC	2
ATG_236	South Fork Taylor Creek	45.237	-106.054	0	0	1	0	1	1	18	PFC	0
ATG_237	South Fork Taylor Creek	45.247	-106.073	0	0	1	0	1	1	19	PFC	0
ATG_238	South Fork Taylor Creek	45.271	-106.108	0	0	0	0	1	0	20	PFC	0
ATG_76wc	Woods Draw	45.024	-106.344	1	0	0	0	0	0	19	PFC	2
ATG_76wcend	Woods Draw	45.023	-106.344	1	0	0	0	0	0	18	PFC	2
ATG_CCC	Otter Creek	45.403	-106.143	0	0	1	1	1	1	19	PFC	0
ATG_CCC	Otter Creek	45.405	-106.143	0	0	1	1	1	1	19	PFC	0

Appendix B. Macroinvertebrate Taxa, Abundance and Metrics for the 20 Collection Sites

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Chironomus*	13
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Berosus*	16
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Cricotopus*	123
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*pseudodiamesa*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Corixidae*	135
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Paratanytarsus*	45
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Helophorus*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Tubificidae*	4
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Dasyhelea*	6
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Enallagma*	4
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Ephydra*	8
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Notonectidae*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Radotanypus*	35
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Illybius*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Calaparyphus*	1
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Agabus*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Enallagma annexum*	2
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Callibaetis*	14
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Physella acuta*	26
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Lestes*	21
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Orthocladiinae*	26
ATG_124	Waddle Creek OW Ranch #1	7/9/2010	EMAP_R500	*Hydrobius*	2
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Lestes*	4
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Tabanus*	28
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Corixidae*	400
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Berosus*	2
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Laccophilus*	2
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Ephydra*	3
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Ablabesmyia*	11
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Oreodytes*	2

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Enochrus*	3
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Helophorus*	4
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Chironominae*	37
ATG_130	Hanging Woman Creek uppermost site in WY private	7/9/2010	EMAP_R500	*Enallagma*	7
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Agabus*	1
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Berosus*	8
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Callibaetis*	22
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Chaoborus*	247
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Chironomus*	26
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Chrysops*	5
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Corixidae*	66
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Cricotopus*	14
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Culex*	5
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Culicoides*	17
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Enallagma*	6
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Gyraulus parvus*	1
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Haliplus*	1
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Helophorus*	12
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Hydrobius*	6
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Hydroporus*	4
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Hygrotus*	1
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Illybius*	4
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Lestes*	20

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Octhebius*	1
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Orthocladiinae*	72
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Probezzia*	3
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Procladius*	2
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Sympetrum*	3
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Tropisternus lateralis*	3
ATG_132	Hanging Woman Creek county road crossing OW Ranch #2	7/9/2010	EMAP_R500	*Tubificidae*	9
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Stagnicola caperata*	61
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Physella acuta*	122
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Sympetrum*	8
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Coenagrion*	1
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Ishnura*	6
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Lestes*	34
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*cricotopus*	43
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Aeshna*	5
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Callibaetis*	54
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Psectrocladius*	3
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Ostracoda*	32
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Haliplus*	6
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Odontomyia*	6
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Corynoneura*	13
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Corixidae*	28
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Helophorus*	1
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Hydroporus*	2
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Paratanytarsus*	29
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Polypedilum*	9
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Enallagma*	22
ATG_134	Hanging Woman Creek WP #134	7/9/2010	EMAP_R500	*Tanypodinae*	30
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Lestes*	13
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Hyalella azteca*	65
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Aeshna*	10

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Physella acuta*	268
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Buenoa*	3
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Libellula*	1
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Fossaria humilis*	11
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Tubificidae*	7
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Corixidae*	3
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Chironomus*	20
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Psectrocladius*	23
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Procladius*	14
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Berosus*	4
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Paratanytarsus*	22
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Haliplus*	12
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Brychius*	5
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Sympetrum*	3
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Enallagma*	8
ATG_137	Hanging Woman Creek WP #137	7/9/2010	EMAP_R500	*Callibaetis*	6
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Aeshna eremita*	18
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Aeshna palmata*	52
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Berosus*	14
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Buenoa*	4
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Callibaetis*	12
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Chironominae*	58
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Corixidae*	3
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Enallagma*	22
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Enochrus*	1
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Haliplus*	26
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Helophorus*	4
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hyalella azteca*	46

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hydrobius*	2
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hygrotus*	2
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hygrotus sp. 2*	2
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Lestes*	82
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Libellula*	10
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Orthocladiinae*	18
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Physella acuta*	64
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Procladius*	12
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Sympetrum*	52
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Tanypodinae*	12
ATG_141	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Tubificidae*	2
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Aeshna*	24
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Berosus*	11
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Buenoa*	4
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Callibaetis*	33
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Chironominae*	24
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Corixidae*	3
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Enallagma*	14
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Enochrus*	1
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Haliplus*	12
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Helophorus*	5
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hyalella azteca*	101
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hydrobius*	2

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hygrotus*	2
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Hygrotus sp. 2*	2
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Lestes*	65
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Libellula*	5
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Orthocladiinae*	27
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Physella acuta*	89
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Procladius*	6
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Sympetrum*	32
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Tanypodinae*	34
ATG_143	Hanging Woman Creek Private Forks Ranch WY border site#1	7/9/2010	EMAP_R500	*Tubificidae*	12
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Aeshna*	12
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Callibaetis*	32
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Coenagrion*	4
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Corixidae*	32
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Corynoneura*	24
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Cricotopus*	80
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Haliplus*	12
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Helophorus*	4
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Hydroporus*	8
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Ischnura*	24
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Lestes*	68
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Odontomyia*	12
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Ostracoda*	32

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Paratanytarsus*	36
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Physella acuta*	92
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Polypedilum*	10
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Psectrocladius*	12
ATG_145	Hanging Woman Creek Private Forks Ranch WY border site#2	7/9/2010	EMAP_R500	*Sympetrum*	32
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Ablabesmyia*	7
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Aeshna*	11
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Berosus*	8
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Buenoa*	7
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Callibaetis*	20
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Chironomus*	9
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Corixidae*	24
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Enallagma*	15
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Fossaria humilis*	25
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Haliplus*	9
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Hyalella azteca*	93
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Hydroporus*	5
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Lestes*	23
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Libellula*	2
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Paratanytarsus*	19
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Physella acuta*	177
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Procladius*	17
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Psectrocladius*	23

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Sympetrum*	3
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Thienemannimyia gr.*	2
ATG_150	Hanging Woman Creek Private Forks Ranch #150	7/9/2010	EMAP_R500	*Tubificidae*	13
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Aeshna*	12
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Agabus*	3
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Berosus*	2
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Buenoa*	3
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Callibaetis*	8
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*chironomus*	8
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Cricotopus*	22
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Enallagma*	13
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Ephydra*	3
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Glyptotendipes*	6
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Haliplus*	6
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Illybius*	4
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Lestes*	55
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Libelulla*	2
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Orthocladiinae*	37
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Ostracoda*	16
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Paratanytarsus*	11
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Physella acuta*	156
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Polypedilum*	2
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Procladius*	11
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Psectrocladius*	66
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Stagnicola elodes*	68
ATG_160	Seventysix Creek trib to Trail Creek	7/10/2010	EMAP_R500	*Sympetrum*	2
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Aeshna*	15
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Agabus*	3
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Berosus*	12
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Callibaetis*	10

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Chironomus*	21
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Enallagma*	18
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Fossaria humilis*	35
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Haliplus*	4
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Illybius*	3
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Lestes*	31
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Lestes dryas*	5
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Orthocladiinae*	37
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Ostracoda*	43
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Paratanytarsus*	14
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Physella acuta*	176
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Polypedilum*	20
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Psectrocladius*	66
ATG_163	Seventysix Creek Lower trib to Trail Creek	7/10/2010	EMAP_R500	*Sympetrum*	6
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Aedes*	4
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Aeshna*	10
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Agabus*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Cricotopus*	50
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Culicoides*	2
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Enallagma*	2
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Fossaria humilis*	13
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Haliplus*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Helophorus*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Hyalella azteca*	25
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Hydrobius*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Illybius*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Lestes*	15

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Octhebius*	2
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Ostracoda*	22
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Paratanytarsus*	2
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Peltodytes*	1
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Psectrocladius*	17
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Stagnicola elodes*	330
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Sympetrum*	13
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Tanypodinae*	3
ATG_179	Trail Creek #179	7/10/2010	EMAP_R500	*Tubificidae*	2
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Aeshna eremita*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Aeshna palmata*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Berosus*	14
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Buenoa*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Caenis latipennis*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Callibaetis*	81
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Chironominae*	50
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Corixidae*	32
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Culicoides*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Dolichopodidae*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*enallagma*	6
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Haliplus*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Helophorus*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Hyalella azteca*	51
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Hydrobius*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Illybius*	6
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Laccophilus*	1

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Lestes*	19
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Libellula*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Orthocladiinae*	7
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Physella acuta*	3
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Physella gyrina*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Procladius*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Simulium*	3
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Stagnicola caperata*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Sympetrum*	2
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Tabanus*	1
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Tanypodinae*	93
ATG_196	Hanging Woman Creek OW Ranch bridge site	7/10/2010	EMAP_R500	*Tubificidae*	3
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Ablabesmyia*	8
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Caenis latipennis*	44
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Callibaetis*	19
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Chironomus*	12
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Coenagrion/Enallagma*	6
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Coenagrionidae*	10
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Corixidae*	58
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Cricotopus*	39
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Cricotopus bicinctus gr.*	6
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Cryptochironomus*	7
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Dicrotendipes*	9

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Dubiraphia*	6
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Erpobdellidae*	2
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Glossiphoniidae*	3
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Hyalella azteca*	122
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Hydroptila*	8
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Micropsectra*	15
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Microtendipes*	4
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Nectopsyche*	2
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Tubificidae*	12
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Oreodytes*	5
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Paracladopelma*	3
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Physella acuta*	33
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Sphaerium*	5
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Procladius*	9
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Pseudochironomus*	2
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Paratanytarsus*	16
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Stagnicola elodes*	5
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Tanytarsus*	26
ATG_200	Hanging Woman Creek at Quietus Road Bridge upstream	7/11/2010	EMAP_R500	*Zavrelimyia*	9
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Agabus*	12
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Ablabesmyia*	5
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Acari*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Caenis latipennis*	15
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Callibaetis*	7

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Caloparyphus*	1
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Chironomus*	23
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Corixidae*	13
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Corynoneura*	6
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Cricotopus bicinctus gr.*	54
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Cricotopus trifascia gr.*	32
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Culicoides*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Dicrotendipes*	7
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Dubiraphia*	4
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Glossiphonia complanata*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Gyraulus parvus*	6
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Helisoma anceps*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Hesperophylax designatus*	4
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Hyalella azteca*	23
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Lestes*	6
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Limnephilus*	8
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Micropsectra*	65
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Nilotanypus*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Parametriocnemus*	25
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Paratanytarsus*	22
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Physella gyrina*	119
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Polypedilum*	20
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Procladius*	8
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Psectrocladius*	25
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Sciomyzidae*	2
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Simulium*	55
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Sympetrum*	1
ATG_201	Otter Creek at Tenmile Creek Road	7/11/2010	EMAP_R500	*Tubificidae*	14
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Agabus*	8
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Apedilum*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Baetis tricaudatus*	15
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Berosus*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Bezzia/Palpomyia*	4
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Centroptilum*	2

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Cheumatopsyche*	5
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Chrysops*	4
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Coptotomus longulus*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Cricotopus*	14
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Cricotopus bicinctus gr.*	7
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Dubiraphia*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Enallagma*	6
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Erpobdellidae*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Eukiefferiella claripennis gr.*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Gammarus*	12
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Gyraulus parvus*	6
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Haliplus*	4
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Hesperophylax designatus*	12
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Hyalella azteca*	45
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Hydrachna*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Lestes disjunctus*	6
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Libellula pulchella*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Limnephilus*	9
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Ochthebius*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Optioservus*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Orconectes virilis*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Oreodytes*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Orthocladius*	9
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Physella gyrina*	176
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Probezzia*	1
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Procladius*	4
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Prodiamesa*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Simulium*	143
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Stagnicola*	2
ATG_202	Otter Creek at Taylor Creek Road	7/11/2010	EMAP_R500	*Tubificidae*	7
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Aeshna*	2
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Argia*	12
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Atrichopogon*	3
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Berosus*	12

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Bezzia*	10
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Caenis latipennis*	122
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Callibaetis ferrugineus*	6
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Ceratopogoninae*	3
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Coenagrion*	32
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Cricotopus bicinctus*	4
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Cryptotendipes*	4
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Dasyhelea*	33
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Dicrotendipes*	21
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Dubiraphia*	3
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Enallagma*	42
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Erpobdellidae*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Gyraulus parvus*	7
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Hyalella azteca*	63
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Orthocladius*	2
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Ostracoda*	45
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Oxyethira*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Parakiefferiella*	6
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Paramerina*	16
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Paratanytarsus*	17
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Paratendipes*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Peltodytes*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Pericoma*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Phaenopsectra*	1
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Physella acuta*	45
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Pisidium*	2
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Polypedilum*	7
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Procladius*	6
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Pseudochironomus*	22
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Simulium*	3
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Tanytarsus*	27
ATG_203	Otter Creek at Camp Creek Road	7/11/2010	EMAP_R500	*Thienemannimyia gr.*	5
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Agabus*	6
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Baetis tricaudatus*	13

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Berosus*	8
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Caenis latipennis*	23
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Centroptilum*	4
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Cheumatopsyche*	33
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Chrysops*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Cricotopus*	11
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Cricotopus bicinctus gr.*	8
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Dubiraphia*	3
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Enallagma*	6
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Erpobdellidae*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Eukiefferiella claripennis gr.*	1
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Gammarus*	13
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Gyraulus parvus*	9
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Haliplus*	4
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Hesperophylax designatus*	25
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Hyalella azteca*	68
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Hydrachna*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Lestes*	8
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Libellula*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Limnephilus*	14
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Ochthebius*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Optioservus*	10
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Orconectes virilis*	1
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Oreodytes*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Orthocladius*	22
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Physella gyrina*	154
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Probezzia*	2
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Procladius*	8
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Prodiamesa*	1
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Simulium*	143
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Stagnicola*	7
ATG_CCC	Otter Creek at CCC Camp USFS	7/11/2010	EMAP_R500	*Tubificidae*	14
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Aeshna palmata*	2
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Berosus*	14

StationID	Site_Name	Start Date	Activity	Taxon	Abund
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Buenoa*	12
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Caenis latipennis*	44
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Callibaetis*	98
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Chironominae*	43
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Corixidae*	52
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Culicoides*	2
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Dolichopodidae*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Enallagma*	16
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Haliplus*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Helophorus*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Hyalella azteca*	66
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Hydrobius*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Illybius*	6
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Laccophilus*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Lestes*	21
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Libellula*	2
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Orthocladiinae*	13
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Physella acuta*	7
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Physella gyrina*	18
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Procladius*	2
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Simulium*	8
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Stagnicola caperata*	13
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Sympetrum*	6
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Tabanus*	1
ATG_235	South Fork Taylor Creek	7/11/2010	EMAP_R500	*Tanypodinae*	54

Appendix C. Raw Fish Data and IBI Metric Calculations Collected from Upper Hanging Woman and Otter Creek Sites

ATG_124	
Species	Number
Brassy Minnow	15
Common Carp*	0
Fathead Minnow	2
Green Sunfish*	0
Lake Chub	0
Pumpkinseed*	0
White Sucker	0
	17

Metrics	**Counts**	**Adjusted Value**	**Score**
Number of Native Fish Species to MT	2	11.464	64
Number of Native Fish Families to MT	1	2.750	51
Number of non-tolerant Cyprinid species	1	6.536	93
Number of Sucker and Catfish Species	0	5.791	64
Number of Moderately Intolerant Species	0	7.459	82
Proportion of Tolerant individuals	11.765	none	88
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	4.471	76
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	11.765	none	87
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100
Number of Fish Species Collected That Were Long-Lived			
Totals			704
Final Calculation			704/1100
IBI Score			**64%**

ATG_141	
Species	Number
Brassy Minnow	10
Common Carp*	0
Fathead Minnow	16
Green Sunfish*	16
Lake Chub	0
Pumpkinseed*	0
White Sucker	0
	42

Metrics	**Counts**	**Adjusted Value**	**Score**
Number of Native Fish Species to Montana	2	10.252	57
Number of Native Fish Families to MT	1	2.530	47
Number of non-tolerant Cyprinid species	1	7.003	100
Number of Sucker and Catfish Species	0	5.063	56
Number of Moderately Intolerant Species	0	6.522	72
Proportion of Tolerant individuals	76.190	none	19
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.909	66
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	38.095	none	57
Proportion of the Total Number of Fish Sampled That Were Native to Montana	61.905	none	62
Number of Fish Species Collected That Were Long-Lived			
Totals			536
Final Calculation			536/1100
IBI Score			**49%**

ATG_145	
Species	Number
Brassy Minnow	0
Common Carp*	0
Fathead Minnow	50
Green Sunfish*	0
Lake Chub	0
Pumpkinseed*	0
White Sucker	0
	50

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	1	8.540	47	100
Number of Native Fish Families to MT	1	2.401	44	100
Number of non-tolerant Cyprinid species	0	8.276	118	100
Number of Sucker and Catfish Species	0	4.636	51	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	100	none	-6	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.579	61	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	100	none	-14	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			468	1100
Final Calculation			673/1000	
IBI Score			**43%**	

ATG_150 + ATG_151		
Species	Number	
Brassy Minnow	0	0
Common Carp*	0	0
Fathead Minnow	40	20
Green Sunfish*	0	0
Lake Chub	0	0
Pumpkinseed*	0	0
White Sucker	0	0
	40	20

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to Montana	1	8.540	47	100
Number of Native Fish Families to MT	1	2.401	44	100
Number of non-tolerant Cyprinid species	0	8.276	118	100
Number of Sucker and Catfish Species	0	4.636	51	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	100	none	-6	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.579	61	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	100	none	-14	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			468	1100
Final Calculation			468/1100	
IBI Score			**43%**	

ATG_196	
Species	Number
Brassy Minnow	0
Common Carp*	2
Fathead Minnow	482
Green Sunfish*	2
Lake Chub	0
Pumpkinseed*	0
White Sucker	0
	486

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to Montana	1	8.540	47	100
Number of Native Fish Families to MT	1	2.401	44	100
Number of non-tolerant Cyprinid species	0	8.276	118	100
Number of Sucker and Catfish Species	0	4.636	51	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	100	none	-6	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.579	61	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	100	none	-14	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	99.177	none	99	100
Number of Fish Species Collected That Were Long-Lived				
Totals			467	1100
Final Calculation			467/1000	
IBI Score			**42%**	

ATG_200	
Species	Number
Brassy Minnow	15
Common Carp*	0
Fathead Minnow	55
Green Sunfish*	0
Lake Chub	0
Pumpkinseed*	0
White Sucker	5
	75

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	3	11.782	65	100
Number of Native Fish Families to MT	2	3.626	67	100
Number of non-tolerant Cyprinid species	1	6.799	97	100
Number of Sucker and Catfish Species	1	6.381	70	100
Number of Moderately Intolerant Species	0	6.931	76	100
Proportion of Tolerant individuals	80	none	15	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	4.154	71	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	73.333	none	17	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			579	1100
Final Calculation			579/1100	
IBI Score			**53%**	

ATG_201	
Species	Number
Brassy Minnow	72
Common Carp*	0
Fathead Minnow	35
Green Sunfish*	0
Lake Chub	10
Pumpkinseed*	0
White Sucker	0
	117

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	3	10.540	59	100
Number of Native Fish Families to MT	1	2.401	44	100
Number of non-tolerant Cyprinid spp.	2	6.276	89	100
Number of Sucker and Catfish Species	0	4.636	51	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	29.915	none	68	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.579	61	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	61.538	none	30	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			568	1100
Final Calculation			568/1100	
IBI Score			**52%**	

ATG_202	
Species	Number
Brassy Minnow	40
Common Carp*	0
Fathead Minnow	5
Green Sunfish*	0
Lake Chub	55
Pumpkinseed*	0
White Sucker	25
	125

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	4	11.540	64	100
Number of Native Fish Families to MT	2	3.401	63	100
Number of non-tolerant Cyprinid species	1	7.276	104	100
Number of Sucker and Catfish Species	1	5.636	62	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	24	none	75	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	1	4.579	78	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	20	none	24	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	67.290	none	23	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			659	1100
Final Calculation			659/1100	
IBI Score			**60%**	

ATG_203	
Species	Number
Brassy Minnow	22
Common Carp*	0
Fathead Minnow	110
Green Sunfish*	0
Lake Chub	0
Pumpkinseed*	0
White Sucker	5
	137

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	3	10.540	59	100
Number of Native Fish Families to MT	2	3.401	63	100
Number of non-tolerant Cyprinid species	1	7.276	104	100
Number of Sucker and Catfish Species	1	5.636	62	100
Number of Moderately Intolerant Species	0	5.971	66	100
Proportion of Tolerant individuals	83.942	none	11	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	1	4.579	78	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	3.650	none	4	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	80.292	none	9	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			555	1100
Final Calculation			555/1100	
IBI Score			**50%**	

ATG_235	
Species	Number
Brassy Minnow	0
Common Carp*	0
Fathead Minnow	0
Green Sunfish*	0
Lake Chub	25
Pumpkinseed*	0
White Sucker	0
	25

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	1	14.186	79	100
Number of Native Fish Families to MT	1	3.425	63	100
Number of non-tolerant Cyprinid species	1	5.104	73	100
Number of Sucker and Catfish Species	0	8.025	88	100
Number of Moderately Intolerant Species	0	10.336	114	100
Proportion of Tolerant individuals	0	none	100	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	0	3.664	62	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	0	none	0	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	0	none	100	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			779	1100
Final Calculation			779/1100	
IBI Score			**71%**	

ATG_CCC	
Species	Number
Brassy Minnow	61
Common Carp*	0
Fathead Minnow	15
Green Sunfish*	0
Lake Chub	10
Pumpkinseed*	4
White Sucker	5
	95

Metrics	**Counts**	**Adjusted Value**	**Score**	**Best**
Number of Native Fish Species to MT	4.00	9.493	53	100
Number of Native Fish Families to MT	2.00	3.029	56	100
Number of non-tolerant Cyprinid species	2.00	7.064	101	100
Number of Sucker and Catfish Species	1.00	4.407	49	100
Number of Moderately Intolerant Species	0.00	4.388	48	100
Proportion of Tolerant individuals	21.05	none	78	100
Proportion out of the Total Number of Fish That Were Insect-Eating Minnows	0.00	none	0	100
Total Number of Fish Species That Prefer to Eat Insects That Live on the Stream Bottom	1.00	3.630	62	100
Proportion of the Total Number of Fish That Require Rocks to Lay Eggs	5.21	none	6	100
Proportion of the Total Number of Individual Fish That Do Not Require Rocks to Lay Eggs, But Have Parental Care of Eggs	15.79	none	82	100
Proportion of the Total Number of Fish Sampled That Were Native to Montana	100.00	none	100	100
Number of Fish Species Collected That Were Long-Lived				
Totals			634	1100
Final Calculation			634/1100	
IBI Score			**58%**	